NATIONAL INSTITUTE OF TECHNOLGY PATNA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Mid Semester Examination March 2022

B. Tech: Semester - 6

Course Name: Software Engineering ***Course Code: CS6402***

Maximum Time: 2 Hours **Max. Marks**:30

Instructions:

1. ***Answer all questions. Answer to sub questions must be given sequentially at one place***.
2. Assume any suitable data, if necessary.
3. The Marks, CO (Course Outcome) and BL (Bloom's Level) related to questions are mentioned on the right-hand side margin.

<table>
<tr><th>S.No</th><th>Question</th><th>Marks</th><th>CO</th><th>BL</th></tr>
<tr><td>1</td><td>a) Name the two fundamental principles that are used extensively in software engineering to tackle the complexity in developing large programs. Explain these two principles by using suitable examples to tackle the complexity associated with developing large programs.
b) Suppose you plan to undertake the development of a product beset with a large number of technical as well as customer related risks. However, from your experience with developing similar products you can anticipate all the risks that you might suffer from. Which life cycle model would you adopt? Give the reasoning behind your answer.</td><td>3

3</td><td>CO-1

CO-2</td><td>1

2</td></tr>
<tr><td>2</td><td>A Software company is planning for a Zombie gaming software. The tasks of the software are given as follows,
<table>
<tr><th>Task</th><th>Time in Days</th><th>Predecessors</th></tr>
<tr><td>A. Robotic control module</td><td>8</td><td>---</td></tr>
<tr><td>B. Texture library</td><td>5</td><td>C</td></tr>
<tr><td>C. Texture editor</td><td>10</td><td>---</td></tr>
<tr><td>D. Character editor</td><td>6</td><td>A, G, I</td></tr>
<tr><td>E. Character animator</td><td>7</td><td>D</td></tr>
<tr><td>F. Artificial intelligence (for zombies)</td><td>7</td><td>---</td></tr>
<tr><td>G. Rendering engine</td><td>6</td><td>---</td></tr>
<tr><td>H. Humanoid base classes</td><td>3</td><td>---</td></tr>
<tr><td>I. Character classes</td><td>3</td><td>H</td></tr>
<tr><td>J. Zombie classes</td><td>3</td><td>H</td></tr>
<tr><td>K. Test environment</td><td>5</td><td>L</td></tr>
<tr><td>L. Test environment editor</td><td>6</td><td>C, G</td></tr>
<tr><td>M. Character library</td><td>9</td><td>B, E, I</td></tr>
<tr><td>N. Zombie library</td><td>15</td><td>B, J, O</td></tr>
<tr><td>O. Zombie editor</td><td>7</td><td>A, G, J</td></tr>
<tr><td>P. Zombie animator</td><td>10</td><td>O</td></tr>
<tr><td>Q. Character testing</td><td>4</td><td>K, M</td></tr>
</table></td><td>6</td><td>CO-3</td><td>3</td></tr>
</table>

	R. Zombie testing | 4 | K, N The management wants to optimize the cost by diverting the resources which could be delayed. So, assume that you are **Project Manager**, you have been asked by your Superior to plan a schedule of the activities properly and report the critical activities to them? Show all the details of scheduling that you would be reporting including which activities could be delayed and to what extent so that management can take a decision to optimize the cost.				
3	a) Algebraically specify an abstract data type(ADT) that stores a set of elements and supports the following operations. Assume that the ADT element has already been specified and you can use it. (i) **New:** creates a null set. **---add:** takes a set and an element and returns the set with the additional elements stored. (ii) **Size:** takes a set as argument and returns the number of elements in the set. (iii) **Remove:** takes a set and an element as its argument and returns the set with the element removed. (iv) **Contains:** takes a set and an element as its argument and returns the Boolean value true if the element belongs to the set and returns false if the element does not belong to the set. (v) **Equals:** takes two sets as arguments and returns true if they contain identical elements and returns false otherwise. b) Using the specification you have developed for the ADT set, reduce the following expression by applying the rewrite rules: equals(add(5, (add (6, new()), add(6, (add(5, new()))))). Show the details of every reduction.		4 2	CO-3 CO-3	4 5
4	a) Express the decision-making involved in the following withdraw cash function of a bank ATM using a decision table. To withdraw cash, first a valid customer identification is required. For this the customer is prompted to insert his ATM card in the card checking machine. If his card is found to be invalid, the card is ejected out along with an appropriate message. If the card is found to be a valid card, the customer is prompted to type his password. If the password is invalid, an error message is shown and the customer is prompted to enter his password again. If the customer enters incorrect password consecutively for three times, then his card is seized and he is asked to contact the bank manager. On the other hand, if the customer enters his password correctly, then he is considered to have validly identified himself and is prompted to enter the amount he needs to withdraw. If he enters an amount that is not a multiple of Rs.100, he is prompted to enter the amount again. After he enters an amount that is a multiple of Rs.100, the cash is dispensed if sufficient amount is available in his account and his card is ejected; otherwise his card is ejected without any cash being dispensed along with a message display regarding insufficient fund position in his account.		4	CO-4 CO-4	4
5	a) Identify the functional and non-functional requirements in the following problem description and write them in SRS format. A cosmopolitan clock software is to be developed that displays up to 6 clocks with the names of the city and their local times. The clocks should be aesthetically designed. The software should allow the user to change name of any city and change the time readings of any clock by typing 'c'(for configure) on any clock. The user should also be able to toggle between a digital clock and an analog clock display by typing either 'd'(for digital) or 'a'(for analog) on a clock display. After the stand-alone implementation works, a web version should be developed that can be downloaded on a browser as an applet and run. The clock should use only the idle cycles on the computer it runs. b) Suppose you have been appointed as the project manager of a large project, identify the activities you would undertake to plan your project. Explain the sequence in which you would undertake these activities by using a flow chart notation. What are some of the factors which make it hard to accurately estimate the cost of software projects?		4 4	CO-3 CO-3	4 6

********** *ALL THE BEST* **********